

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): A computer-implemented method  
2 comprising:  
3 a) accepting forwarding liveness status information  
4 of at least two different interfaces;  
5 b) composing a message including the forwarding  
6 liveness status information; and  
7 c) sending the message towards a neighbor node.

1 Claim 2 (currently amended): The computer-implemented  
2 method of claim 1 further comprising:  
3 d) maintaining a first timer for tracking a send time  
4 interval, wherein the acts of composing a message and  
5 sending the message are performed after expiration of  
6 the first timer; and  
7 e) restarting the first timer after the message is  
8 sent.

1 Claim 3 (currently amended): The computer-implemented  
2 method of claim 2 wherein the message further includes a  
3 dead time interval, and wherein the send time interval is  
4 less than the dead time interval.

1 Claim 4 (currently amended): The computer-implemented  
2 method of claim 2 wherein the message further includes a  
3 dead time interval, and wherein the send time interval is  
4 no more than one third of the dead time interval.

1 Claim 5 (currently amended): The computer-implemented  
2 method of claim 2 wherein the send time interval is less  
3 than one second.

1 Claim 6 (currently amended): The computer-implemented  
2 method of claim 2 wherein the send time interval is less  
3 than 100 msec.

1 Claim 7 (currently amended): The computer-implemented  
2 method of claim 1 wherein the message further includes a  
3 dead time interval.

1 Claim 8 (currently amended): The computer-implemented  
2 method of claim 1 wherein the act of sending the message  
3 includes providing the message in an Internet protocol  
4 packet.

1 Claim 9 (currently amended): The computer-implemented  
2 method of claim 8 wherein the message is sent towards the  
3 neighbor node by setting a destination address in the  
4 Internet protocol packet to a multicast address associated  
5 with routers that support aggregated interface forwarding  
6 liveness.

1 Claim 10 (currently amended): The computer-implemented  
2 method of claim 1 wherein the status information includes a  
3 forwarding liveness state selected from a group of  
4 forwarding liveness states consisting of (A) interface up,  
5 (B) interface down, (C) interface monitor not reporting,  
6 and (D) forwarding engine restarting.

1 Claim 11 (currently amended): For use with a node, a  
2 computer-implemented method comprising:  
3 a) receiving a message including  
4 i) forwarding liveness status information for a  
5 first set of at least two different interfaces,  
6 and  
7 ii) a time interval; and  
8 b) updating neighbor node forwarding liveness status  
9 information using the message.

1 Claim 12 (currently amended): The computer-implemented  
2 method of claim 11 wherein the act of updating neighbor  
3 node liveness status information includes  
4 i) setting a first timer to the time interval  
5 and starting the first timer,  
6 ii) if the first timer expires, setting a status  
7 of each of the at least two different interfaces  
8 an interface of the neighbor node to down; and  
9 iii) if a further message, sourced from the  
10 neighbor node, and including  
11 A) forwarding liveness status information,  
12 and  
13 B) a new time interval,  
14 is received then, resetting the first timer to  
15 the new time interval and restarting the first  
16 timer.

1 Claim 13 (currently amended): The computer-implemented  
2 method of claim 12 wherein each of the time interval and  
3 the new time interval is less than one second.

1 Claim 14 (currently amended): The computer-implemented  
2 method of claim 11 wherein the forwarding liveness status  
3 information is interface forwarding liveness status  
4 information.

1 Claim 15 (currently amended): The computer-implemented  
2 method of claim 11 wherein the status information includes  
3 a forwarding liveness state selected from a group of  
4 forwarding liveness states consisting of (A) interface up,  
5 (B) interface down, (C) interface monitor not reporting,  
6 and (D) forwarding engine restarting.

1 Claim 16 (currently amended): The computer-implemented  
2 method of claim 11 wherein the forwarding liveness status  
3 information includes at least one of (i) the integrity and  
4 correct operation of forwarding tables, (ii) the integrity  
5 and correct operation of switch fabric, (iii) the integrity  
6 and correct operation of a forwarding lookup engine, (iv)  
7 the integrity and correct operation of a traffic scheduler,  
8 (v) the integrity and correct operation of a traffic  
9 classifier, (vi) the integrity and correct operation of  
10 buffers in the data plane, (vii) the integrity and correct  
11 operation of packet segmentation modules, (viii) the  
12 integrity and correct operation of packet reassembly  
13 modules, (ix) the integrity and correct operation of packet  
14 re-sequencing modules, (x) whether or not a node is  
15 restarting, (xi) whether or not the forwarding plane is  
16 congested, or and (xii) the integrity and correct operation  
17 of fragmentation modules.

1 Claim 17 (currently amended): The computer-implemented  
2 method of claim 11 wherein the forwarding liveness status

3 information includes at least one of (i) bit error rate at  
4 a link interface, and (ii) clock synchronization at a link  
5 interface.

1 Claim 18 (currently amended): A computer-implemented  
2 method for monitoring interface forwarding liveness, the  
3 method comprising:  
4 a) determining, at a first node, forwarding liveness  
5 status information for at least two different  
6 interfaces ~~an interface~~;  
7 b) sending, from the first node, a message including  
8 the determined status information;  
9 c) receiving, at the second node, the message; and  
10 d) updating, by the second node, first node  
11 forwarding liveness status information using the  
12 message.

1 Claim 19 (currently amended): The computer-implemented  
2 method of claim 18 wherein the message further includes a  
3 dead interval, and wherein the act of updating first node  
4 forwarding liveness status information includes  
5 i) setting a timer to the dead interval;  
6 ii) starting the timer;  
7 iii) determining whether or not a further  
8 message including forwarding liveness status  
9 information is received from the first node  
10 before the expiration of the timer; and  
11 iv) if it is determined that a further message  
12 including forwarding liveness status information  
13 is not received from the first node by the second  
14 node before the expiration of the timer, then  
15 informing the second node that the at least two

16                    different interfaces ~~interface~~ of the first node  
17                    ~~is~~ are down.

1    Claim 20 (currently amended): The computer-implemented  
2    method of claim 18 wherein the status information includes  
3    a forwarding liveness state selected from a group of  
4    forwarding liveness states consisting of (A) interface up,  
5    (B) interface down, (C) interface monitor not reporting,  
6    and (D) forwarding engine restarting.

1    Claim 21 (currently amended): The computer-implemented  
2    method of claim 18 wherein the forwarding liveness status  
3    information includes at least one of (i) the integrity and  
4    correct operation of forwarding tables, (ii) the integrity  
5    and correct operation of switch fabric, (iii) the integrity  
6    and correct operation of a forwarding lookup engine, (iv)  
7    the integrity and correct operation of a traffic scheduler,  
8    (v) the integrity and correct operation of a traffic  
9    classifier, (vi) the integrity and correct operation of  
10   buffers in the data plane, (vii) the integrity and correct  
11   operation of packet segmentation modules, (viii) the  
12   integrity and correct operation of packet reassembly  
13   modules, (ix) the integrity and correct operation of packet  
14   re-sequencing modules, (x) whether or not a node is  
15   restarting, (xi) whether or not the forwarding plane is  
16   congested, or ~~and~~ (xii) the integrity and correct operation  
17   of fragmentation modules.

1    Claim 22 (currently amended): The computer-implemented  
2    method of claim 18 wherein the forwarding liveness status  
3    information includes at least one of (i) bit error rate at

4 a link interface, and (ii) clock synchronization at a link  
5 interface.

1 Claim 23 (currently amended): A machine-readable medium  
2 having stored thereon a machine readable data structure  
3 comprising:

- 4 a) an indication, for at least two different  
5 interfaces ~~an interface~~ of a node, of a forwarding  
6 liveness state of the interface; and  
7 b) a dead interval.

1 Claim 24 (original): The machine-readable medium of claim  
2 23 wherein the indication indicates a forwarding liveness  
3 state selected from a group of forwarding liveness states  
4 consisting of (A) interface up, (B) interface down, (C)  
5 interface monitor not reporting, and (D) forwarding engine  
6 restarting.

1 Claim 25 (currently amended): The machine-readable medium  
2 of claim 23 wherein the indication indicates a forwarding  
3 liveness of an interface and includes at least one of (i)  
4 the integrity and correct operation of forwarding tables,  
5 (ii) the integrity and correct operation of switch fabric,  
6 (iii) the integrity and correct operation of a forwarding  
7 lookup engine, (iv) the integrity and correct operation of  
8 a traffic scheduler, (v) the integrity and correct  
9 operation of a traffic classifier, (vi) the integrity and  
10 correct operation of buffers in the data plane, (vii) the  
11 integrity and correct operation of packet segmentation  
12 modules, (viii) the integrity and correct operation of  
13 packet reassembly modules, (ix) the integrity and correct  
14 operation of packet re-sequencing modules, (x) whether or

15 not a node is restarting, (xi) whether or not the  
16 forwarding plane is congested, and or (xii) the integrity  
17 and correct operation of fragmentation modules.

1 Claim 26 (original): The machine-readable medium of claim  
2 23 further comprising:  
3 c) an identifier of the node.

1 Claim 27 (original): The machine-readable medium of claim  
2 26 wherein the node is a router and wherein the identifier  
3 is a router identifier.

1 Claim 28 (original): The machine-readable medium of claim  
2 23 further comprising:  
3 c) an interface index.

1 Claim 29 (currently amended): For use with a node,  
2 elements comprising:  
3 a) means for accepting forwarding liveness status  
4 information of at least two different interfaces;  
5 b) means for composing a message including the  
6 forwarding liveness status information; and  
7 c) means for sending the message towards a neighbor  
8 node.

1 Claim 30 (original): The elements of claim 29 further  
2 comprising:  
3 d) means for maintaining a first timer for tracking a  
4 send time interval, wherein the means for composing a  
5 message and sending the message compose and send the  
6 message after expiration of the first timer; and



7           e) means for restarting the first timer after the  
8           message is sent.

1   Claim 31 (original): The elements of claim 30 wherein the  
2   message further includes a dead time interval, and wherein  
3   the send time interval is less than the dead time interval.

1   Claim 32 (original): The elements of claim 30 wherein the  
2   message further includes a dead time interval, and wherein  
3   the send time interval is no more than one third of the  
4   dead time interval.

1   Claim 33 (original): The elements of claim 30 wherein the  
2   send time interval is less than one second.

1   Claim 34 (original): The elements of claim 30 wherein the  
2   send time interval is less than 100 msec.

1   Claim 35 (original): The elements of claim 29 wherein the  
2   message further includes a dead time interval.